

Exam 1 -- Summer 2012 – Solution Notes

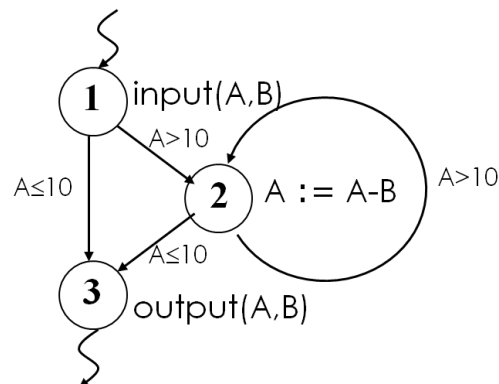
1. e
2. a. true; b. false; c. false; d. true
3. It could be a symptom of overstaffing, or that the project organization (the break-down of work tasks among the staff) is such that nobody can do anything without affecting everyone else – i.e., frequent meetings are required to coordinate overlapping work activities.
4. e
5. # of test cases required for **strong equivalence class testing**: **15**
of test cases required for **weak equivalence class testing**: **5**
6. a. true; b. false; c. false; d. false; e. true
7. a. function: the program sets Y to the absolute value of X; final variable values: $X=X_0$, $Y=|X_0|$
b. correctness: this cannot be determined since no specification of requirements was provided.
8. a. The authors note that behavioral studies have found NO evidence of synergy as a source of group performance advantage. (Several references are provided.)
b. The theory predicts that group meetings do NOT discover significant numbers of **new** defects beyond the aggregation of those discovered by individual reviewers.
c. The theory predicts the performance advantage of group meetings over that of individual reviewers is **a function of the level of false positives discovered by individuals**. The improvement lies in the application of **joint expertise** to discriminate true defects from false positives.
9. If A OR B then
 s
 end_if
 Tests 1 and 2 provide path coverage but not compound condition coverage (neither TF nor FT are covered). Therefore, path coverage does not subsume compound condition coverage.

	A	B	true path	false path
test 1	false	false	X	√
test 2	true	true	√	X

10. a. By monitoring the white-box (structural) coverage achieved during black-box testing (via program instrumentation), fewer white-box test cases will normally need to be designed/implemented to achieve the white-box coverage goals.
 b. An incremental testing strategy that progresses from smaller program elements (e.g., "units") to larger ones (eventually, the entire system) **significantly reduces error localization and correction time.**
11. Soak testing refers to testing a system version over a significant period of time (even as new versions become available). Its purpose is to discover **latent** errors or performance problems (due to memory leaks, buffer/file overflow, etc.) that are not likely to become evident otherwise.
12. $20:60 = 10:30 \Rightarrow 30-10 = \mathbf{20}$ is the estimate of non-seeded errors remaining
13. a. ii; b. ix
14. a. pow returns +HUGE_VAL; Matherr sets errno to OVERFLOW
 b. pow returns 1; Matherr sets errno to DOMAIN
 c. pow returns 0; Matherr sets errno to DOMAIN
 d. pow returns +HUGE_VAL; Matherr sets errno to DOMAIN
15. a. One may need **drivers** to take the place of missing program elements that call/use other program elements, **stubs** to take the place of missing elements being called/used by other elements, and an **oracle** to assist in determining if an element executes in accordance with requirements.
 b. Yes, scaffolding may be required whenever program elements are tested in the absence of other program elements that they call or are called by, or whenever another program (an oracle) is required to determine if the element(s) is/are executing in accordance with requirements.
16. O, P, R, I, C, W, K, A, S, H, F, G, N
17. a.

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1. input(A,B)
   while (A>10) do
2.   A := A-B
   end_while
3. output(A,B)
  
```



b.

<u>variable</u>	<u>du-pair</u>	<u>du-path(s)</u>
A	(1,2)	<1,2>
	(1,3)	<1,3>
	(1,<1,2>)	<1,2>
	(1,<1,3>)	<1,3>
	(2,2)	<2,2>
	(2,3)	<2,3>
	(2,<2,2>)	<2,2>
	(2,<2,3>)	<2,3>
B	(1,2)	<1,2>, <1,2,2>
	(1,3)	<1,2,3>, <1,2,2,3>, <1,3>

c. i. 1; ii. 2; iii. 3

18. $Y > 0 \ \& \ X < 0 \ \& \ (Y+X) > 0 \ \& \ X < 0 \ \& \ (Y+2X) \leq 0$

19. The seemingly "hyperbolic step" is initially RUNNING (not just implementing) the test BEFORE the code is actually implemented.